

US LHCb Involvement

Philip Ilten, and Michael Sokoloff
University of Cincinnati, Cincinnati, OH

Matt Durham, and Cesar da Silva
Los Alamos National Laboratory, Los Alamos, NM

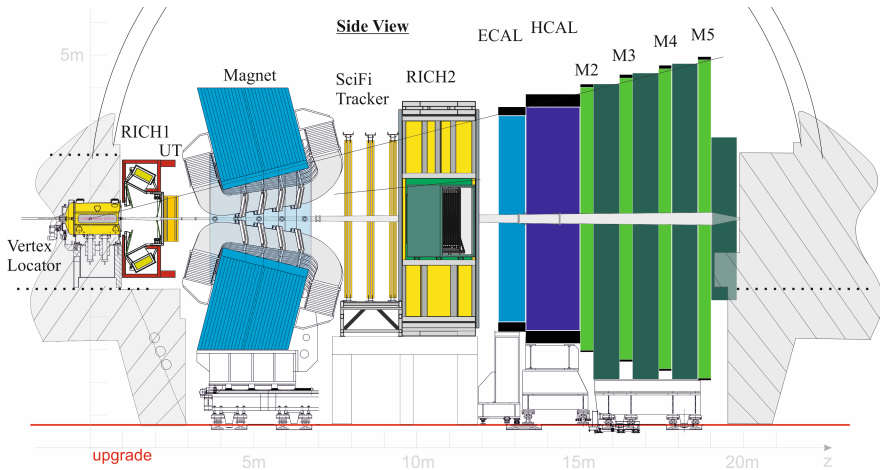
Hassan Jawahery, and Manuel Franco Sevilla
University of Maryland, College Park, MD

Mike Williams
Massachusetts Institute of Technology, Cambridge, MA

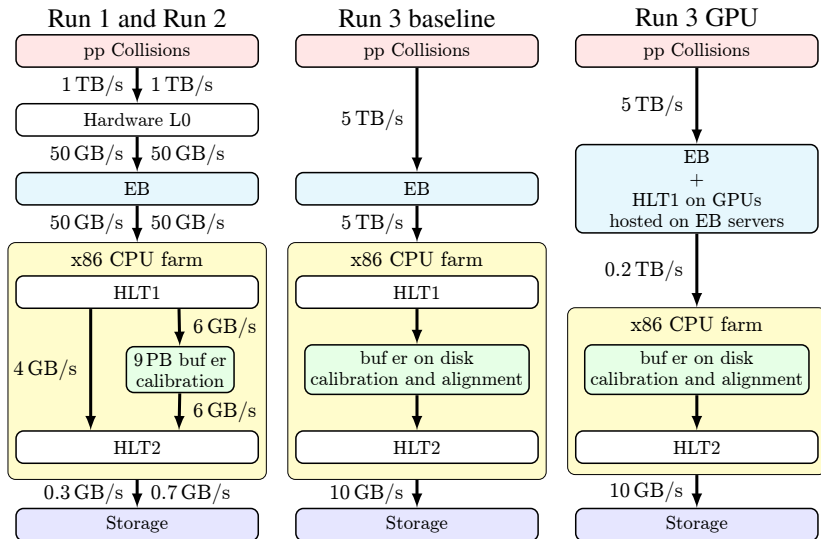
Christine Aidala
University of Michigan, Ann Arbor, MI

Marina Artuso, Steven Blusk, Matthew Rudolph, Tomasz Skwarnicki,
and Sheldon Stone
Syracuse University, Syracuse, NY

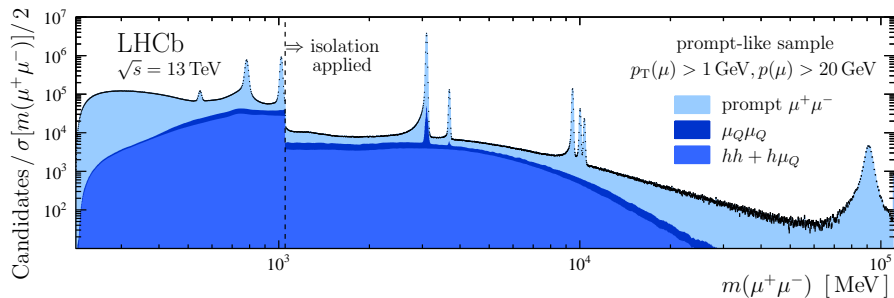
Detector



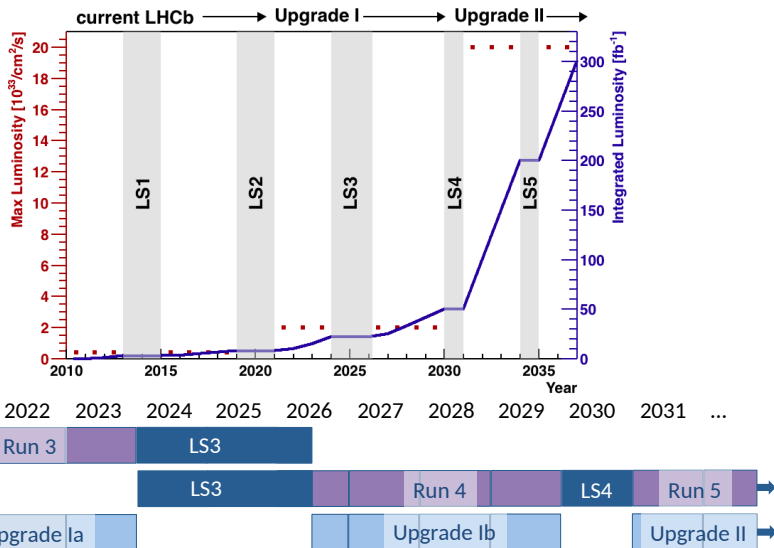
Real Time Analysis



Proof-of-Concept

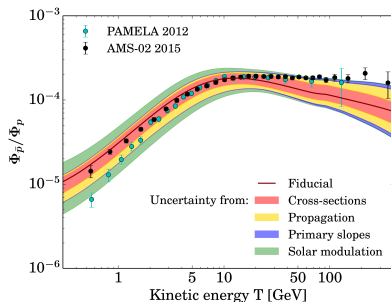


Timeline

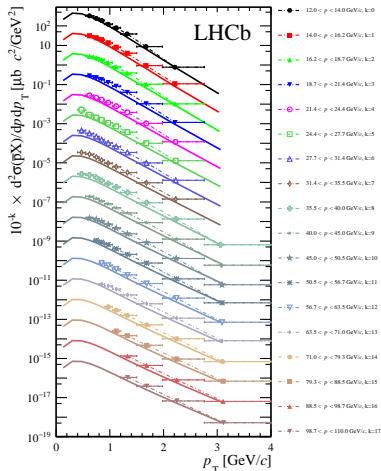


Supporting Measurements

PRL 121 (2018)

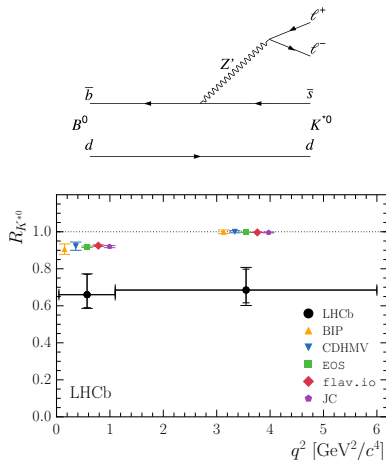


- use LHCb as fixed target with SMOG
- measurement of \bar{p} cross-section in $p + \text{He}$



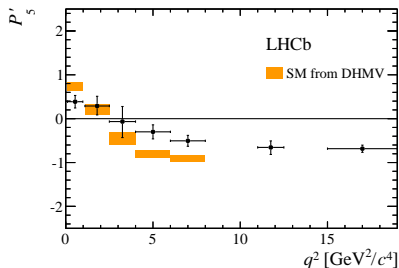
Indirect Measurements

JHEP 08 (2017)



JHEP 02 (2016)

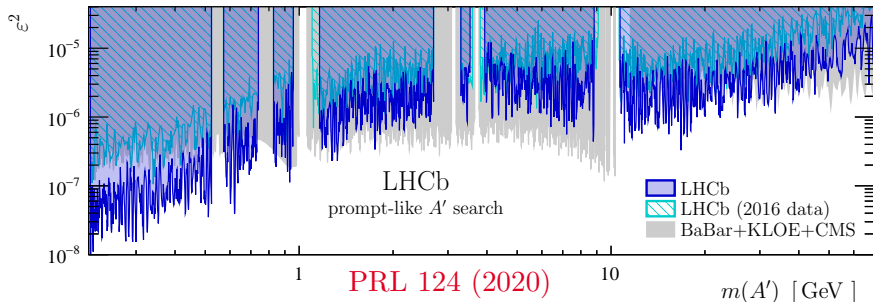
$$B^0 \rightarrow K^{*0} \mu \mu$$



- any number of possible examples

Direct Searches

- areas where LHCb does not compete
 - **luminosity:** $10\times$ less luminosity than ATLAS/CMS
 - **acceptance:** 10% for 100 GeV, 1% for 1 TeV, ...
- areas where LHCb does well
 - **flavor:** anything that requires PID other than pions/leptons
 - **displaced:** 50 fs lifetime resolution
 - **narrow:** 0.4% mass resolution (muons)
 - **trigger:** flexible with real time calibration and full reconstruction



- already have a starting point with [arXiv:1808.08865](#) developed for European Strategy for Particle Physics
- update results in relevant areas
- document in progress since August this year, aiming for end of October
- resonance searches using B -decays (ALPs, HNLs, ...)
- non-conserved currents in penguin B -decays
- inclusive resonance searches ($A' \rightarrow ee$, $A' \rightarrow \mu\mu$, ...)

Joint Efforts and Outcomes

- ensure community is aware of future LHCb capabilities
- support for Upgrades Ib and II
- incorporate LHCb results into relevant summaries
- better understand cosmologically motivated targets
- determine with TF any motivated overlooked signatures

